PROFILER QUICK MANUAL

Charging

Important: use the correct adapter for the Profiler battery charger and the correct one for the PDA (see image below): they have different voltages! Also: do not charge the PDA for more than 12 consecutive hours, this will damage the unit!

The PDA should be charged for several hours after each survey directly through its adapter, or whenever the battery gauge reads 25% or less. Profiler batteries can be charged inside a cradle and should operate ~10 hours on a single charge and take ~4 hours to recharge.

The operator

The operator of the profiler should not have any large metallic objects on their person and should never carry any wireless devices, such as a cell phone. They should not wear steel toed boots. Note that the height of the profiler from the ground would be different for operators of different height, therefore you cannot switch operators in the middle of a survey.

To make reasonable measurements of apparent conductivity the profiler should be operated with the low carry handle (and you cannot use the shoulder strap nor the PDA mount).

Putting together the profiler

First insert the charged batteries into the electronics box on the profiler. To **remove the battery pack** from the electronic box on the profiler, first unlock the two little black clips that can be turned 90 degrees to lock the pack in place (one has already broken off…) Then **very carefully** push the two retaining clip locks on the battery pack towards the center until they snap out and remove the battery pack. Now check the positioning of the 5 contact slots inside the profiles to correctly insert the charged battery into the battery pack. To **insert the battery pack**, align the 5 contact slots on the battery inside the pack with the terminals in the electronics box and **gently** click the pack into place until the retaining springs click. Then turn the two clips.

Since we will use the profiler for apparent conductivity measurements, we will install the Low Carry Handle in such a way as to level the rod with the coils at a low height above the ground (~20-25 cm) when carried. The handle should be level, so that the profiler will be level with the ground when carried. Screw the two clamps of the handle onto the rod between the two coils, so that **the handle is level and the coils will be about 20-25 cm above the ground**

when carried using the handle. This means that the clamps have to be mounted relatively close to the coils for a person of average height. The battery pack and electronics box will be on the bottom of the unit, closer to the ground, when the profiles is carried by the handle.

The power switch for the profiler is on the side of the electronics box. Turn on the unit: the Green power LED will illuminate, as well as the Blue Bluetooth communication light (the blue light may turn off every now and then).

Turning on the PDA

Turn on the PDA by pressing the green on/off button. You will get an error message (theoretically this means that the equipment was not turned off in proper order for the last survey, but appears to always happen). **The stylus is in the back of the PDA, make sure not to lose it and return it to this position when you are not using it!**

Make sure that the date and time on the handheld are set correctly, otherwise tap on the date and modify.

Start the profiler software, from the pull-down menu under the Windows icon in the top left. Wait until the main menu, a list of commands, is displayed (once communication between the PDA and the profiler has been established, this may take a minute). **It is important not to change any settings other than those described below**, unfortunately modifying certain other settings may cause severe problems!

Profiler software: set up names

Select *Recall Setup* and tap setup number 1, to set some of the default parameters correctly. (Select *Yes* to confirm.)

Select *Review Parameters* and type in a descriptive name for the *Project* (only use letters; max of 21 characters), which will be the data directory name. Also update the *site* and *operator*. Choose a *next file* name, note that you should have a 3 digit number at the end, which will be automatically incremented for each new survey and keep it short! **Make notes in your field notebook of all of these names!** Tap on the *date* yellow box to synch with the PDA internal clock. *Units* should be metric, otherwise change to metric, by tapping on *Units*. Hit OK in the bottom right to return to the main menu.

Profiler software: set up GPS

Under *Diagnostics*, go to *System Setup;* all three boxes shown should be checked.

Select *GPS test*; make sure at least 4 satellites are visible and wait until the GPS status is Valid. This may take several minutes, depending on the signal or whether you have moved to a completely new location. Note that the GPS unit is in the PDA, not the Profiler!

Once the GPS status is shown to be valid, tap on the *System Time* yellow box, to synchronize the internal PDA clock with the System Time in UTC (or GMT time).

Tap OK (bottom right) three times to return to the main menu.

Profiler software: set up data display type

Go to *Collect Data.* Conductivity should be checked. Make sure the *Levels* GPS display mode is selected. Tap OK to return to main menu.

Profiler software: select survey parameters

Go to *Select Parameters*; the *Mode* should be set to FreeWay, *Interval* to 2 sec, *Freq 1* to 5000, *Freq 2* to 15000 (this is the GSSI recommended frequency for apparent conductivity), *Freq 3* to 16000 (you can only have a specific frequency selected once, so if the wrong frequency

number has that value, you first will need to change it to be able to use it for the correct frequency number), *Orientation* to VDM(I). This orientation means you carry the profiler next to your body, not in front. We will return to this menu later. Tap OK to return to main menu.

Profiler software: system calibration

Lift up the profiler by the handle and measure the height between the ground and the horizontal seam in the coil covers.

Important: in the next menu NEVER select *Free Space Calibration*, this will reset the unit and it would have to be returned to the factory! If you were to accidentally tap this button, always choose *No* when asked if you want to proceed.

Select *Diagnostics->System Calibration*; enter the measured height; then place the profiler on the ground and walk at least 12 feet away from the profiler with the PDA (there should be no metallic objects or other people within 12 feet from the profiler).

Select *Field Calibration* (you will get a warning message, select *Yes* to continue); the instrument will now calibrate itself and scroll through the three frequencies; when done, the system will prompt to pick up the instrument.

Pick up the profiler and select *Operator Calibration.* Hit OK when ready, the instrument will now calibrate with the operator for the three frequencies. The display will prompt *Done* when finished. Hit OK a few times to return to the main menu.

Profiler software: set in-phase zero level

Return to *Select Parameters*; select "set" under the box *Zero Level for in-Phase.* The line frequency should be marked to be 60 Hz. Then tap *Start Profiler.* The Profiler will now determine the average values for the three frequencies, once those values stabilize (10-20 seconds), select *Stop Profiler*. Then tap *Set* to fix the values and *OK* to return to *Select Parameters.* Check the *Use Zero Level* box to use the measured values and zero out the in-phase values. Hit OK to return to main menu.

Profiler software: display preferences and grid settings

Go to *Diagnostics->Display Preferences->Data Display Colors.* At the bottom it shows the dot size of a data point on the screen. This should be at least 1 or 2 m. Note that if you would like to adjust it, you can do this by selecting the << or >> with the stylus.

Go to *Main->Grid Config.* Enter the approximate size of your survey grid in meters (start both X and Y at 0, with the maximum lengths as positive values, best as multiples of ten), keep step and spacing at 2. To get a nice looking display during the survey, choose approximate the correct maximum lengths. You will walk in approximate straight lines along the X-axis, following the *xLBZ* pattern (note this pattern, you will need to choose your starting point appropriately!). Choose *XTraverse*.

Profiler software: collect data

Go to *Collect Data*; select *Start Data Collection.* You will now see the data display screen with the transmit frequencies and the Project name. The system will display the collect data screen but will not start to collect data until the user presses the enter key again. The system will then begin to collect data. **IMMEDIATELY tap the PDA screen to change from the line/bar graph data display to the color map display** and begin to walk along the starting transect. After about 5-10 readings the display will start repositioning the data along the X axis. Note that your starting point will be the origin of your display, and the direction that you start walking in will become the positive X- direction. To your left will be the positive Y direction. The display will

not re-center again and you will not be able to see any "negative" Y values, **so choose your starting point and walking direction carefully**!

Note that the GPS symbol should be green in the upper left of the display.

You can save a bitmap image at any time by tapping the *save img* field along the Y axis. *(This has not worked successfully so far.)*

You can change the dot size (see previous section).

According to the manual, you can zoom in or shift the display with the arrow keys on the PDA keypad, also to expand the survey area beyond its original limits. This has not been tested yet.

Finish collecting the data across the entire survey area. When done, tap OK, and then *Stop Data Collection*, choose yes. Wait until the file is closed and you are returned to the main menu. Finally, shut down the system from the *Main* menu and tap OK on the bottom left, select *Exit.*

THIS HAS NOT WORKED (YET): Profiler software: review data

Go to *Main->Review Data*; select the correct project and file. The *Select Data Value* screen will be shown, choose conductivity and freq 2. Then select *plot*, to see a quick contour of the collected data. By tapping on the display you can change the color bar.

Downloading Data (checked on Toughbook CF-52 with Windows 7 sticker)

From the Profiler "briefcase", take the USB cable (should be in the lid, in a little pouch on the right hand side). The end with the smaller USB connector should be connected to the bottom of the PDA (to the left of the serial port). The larger USB connector goes into one of the Toughbook's USB ports. Turn on the PDA. The Windows Mobile Device Center software should start up. **Click on '*Connect without setting up your device*".** Under *File Management*, select *Browse the contents of your device*. A new window opens up, showing the disk of the PDA. The name of the PDA device (shown in the left sidebar) is Trimble Navigation Ltd. Nomad. Double-click the disk symbol. Click on the Folder *Profiler*, then *Data*. Each project name will have its own folder. Each file inside the folder will have three versions. Drag the folder onto the laptop (create a new Folder in the Documents Folder, give it a clearly descriptive name and then copy the data). Turn off the PDA. The .EMI files may be read as comma separated data files in Excel, with a header contained metadata information and columns of lat/lon/altitude and columns with the multi-frequency data.

Basic Plotting

On the desktop, click on MagMap2000. Open one of your .EMI files. A window pops up with your metadata*. Check the Use GPS* positions box. Hit OK. Now you will see a map with your GPS points. Right-click inside this map, and select *Plot Mag Field in 2D Contours*. Inside the new colored map, right-click again, select *Plot Sensors Setup*, and choose to display *Conductivity [15000]* (for example, this is considered the best frequency for conductivity measurements). Hit OK. This is as far as I got…